Linn DS

Control4 Driver User Guide
Version 1.75

Introduction

This driver provides the network connectivity for Linn DS series and Linn Kustom devices. A complete system configuration requires a single instance of this driver and one instance of the DS series or Kustom driver per DS or Kustom device in the system. It also requires a CI-Gateway, which can either be enabled on some Linn devices or be run using Linn's Kazoo Server software.   See CI-Gateway Configuration for further details.

The Linn device(s), CI-Gateway and this driver should be fully configured before proceeding to install the Linn DS and Kustom driver(s).

IMPORTANT NOTICE

If you are installing Linn Songcast Network, DS or Kustom drivers into a system that already contains versions of these drivers older than <u>version 170</u> you must update all of these existing drivers to the latest version as the connections and internal communication protocols have changed. To do this:

- **<u>Remove any instances of the Linn DS Network or Linn DS Network + Pins driver</u> in the system (these are replaced by the new Linn Songcast Network driver).**

- **Download and install the latest online version of the Linn Songcast Network driver by going to the Search tab, unticking "Local", finding the driver and then right-clicking and selecting "Download Driver".**

- **Download the latest online version of the any DS or Kustom drivers by going to the Search tab, unticking "Local", finding the drivers and then right-clicking and selecting "Download Driver".**

- **Update each driver either by using the Driver->Manage Drivers and Agents dialog, or by right-clicking on an instance of it in your project hierarchy, selecting "Update Driver" and choosing the driver file you have downloaded.**

Installation Types

This driver supports two alternative usages of the Linn products. The DS or Kustom output can either be linked to a room and directly supply its audio/video to that room (standalone room mode, or "room" for short), or it can be installed behind an A/V matrix switch and its output is then supplied to one or more rooms via that switch (matrix switch mode, or "matrix" for short). Note that these two usages cannot be mixed – a DS behind a matrix switch cannot also be used to directly play to a room due to grouping and audio synchronization issues. Where set-up of the driver differs based on the usage, this will be highlighted in the instructions.

Linn Configuration

Please make sure that the corresponding Linn device has been configured correctly and is on the same network as the Control4 processor, prior to configuration of this Control4 driver.

The minimum configuration that is required to have a Linn DSM appear correctly in Control4 or Linn's music control app, is to set the DSM's Room and set which Sources are in use.

The Linn DSM can be configured using the Manage Systems option within your Linn Account (https://www.linn.co.uk/account).

Setting the Room name

Select the device and then on the **GENERAL** tab of the Linn DSM's configuration page, enter the desired room name in the System Name field. By default, it will be set to "Main Room". It is important to view/change the room names for each device as these room names get discovered in the Control4 drivers. A meaningful name should be used to avoid confusion when associating Linn rooms to Control4 device drivers later.

IMPORTANT! The Linn room name is used to associate the Linn device with the Control4 driver. If this name is changed after the driver has been installed, it will no longer work. You will need to select the *Re-read Configuration* action to re-associate for a driver installed by SDDP or choose the new room name from the room name drop-down for a manually installed driver.

Setting up Sources

Select the **SOURCES** tab from the Linn DSM's configuration page. For each source that is in use on the Linn DSM, expand and enter the source's name. You must rename the source from the default name for it to register as being configured. It is useful to provide a meaningful name for the source as this is seen later during Control4 configuration. Show the sources you want available and hide those you don't by clicking on the visibility (eye) icon next to the source.

Set-up of the login details for any sources that are streaming services is done through the configuration of the CI-Gateway either by browsing to http://<ip-address>:4100 on the Linn device hosting the gateway or going to the Gateway API section of the Kazoo Server using its **Configure Kazoo Server** UI (right click on the icon in the system tray).

Advanced Configuration

For more advanced configuration please refer to the **Help & Support** link within the account page.

Driver Installation

The following driver files are included in the release package.

Driver File Name	Description
comms_ip_linn_songcast.c4z	This is the network driver and it handles discovery of devices. Only one instance is required.
mediaservice_ip_linn_airable.c4z mediaservice_ip_linn_calmradio.c4z mediaservice_ip_linn_pins.c4z mediaservice_ip_linn_playlists.c4z mediaservice_ip_linn_qobuz.c4z mediaservice_ip_linn_radio.c4z mediaservice_ip_linn_roon.c4z mediaservice_ip_linn_spotify.c4z mediaservice_ip_linn_tidal.c4z mediaservice_ip_linn_tunein.c4z	These drivers represent the streaming services available through the Linn system. They are installed as needed and configured automatically by the network driver.

mediaservice_ip_linn_upnpall.c4z
mediaservice_ip_linn_upnpfav.c4z

mediaservice_ip_linn_ds.c4z	This driver is used for control of individual DS or room player devices. One instance is required for each device.
mediaservice_ip_linn_kustom_2x4.c4z	This driver is used for control of Kustom DSM devices that have 2 streamers and 4 output zones. One instance is required for each device.
mediaservice_ip_linn_kustom_4x8.c4z	This driver is used for control of Kustom DSM devices that have 4 streamers and 8 output zones. One instance is required for each device.

Table 1: Driver Descriptions

If you are not installing directly from the Control4 online library, copy the above files from the zip package to your Control4 driver location (by default this is *Documents\Control4\Drivers*). Open Composer and choose the **Search** tab from the **Items** pane.
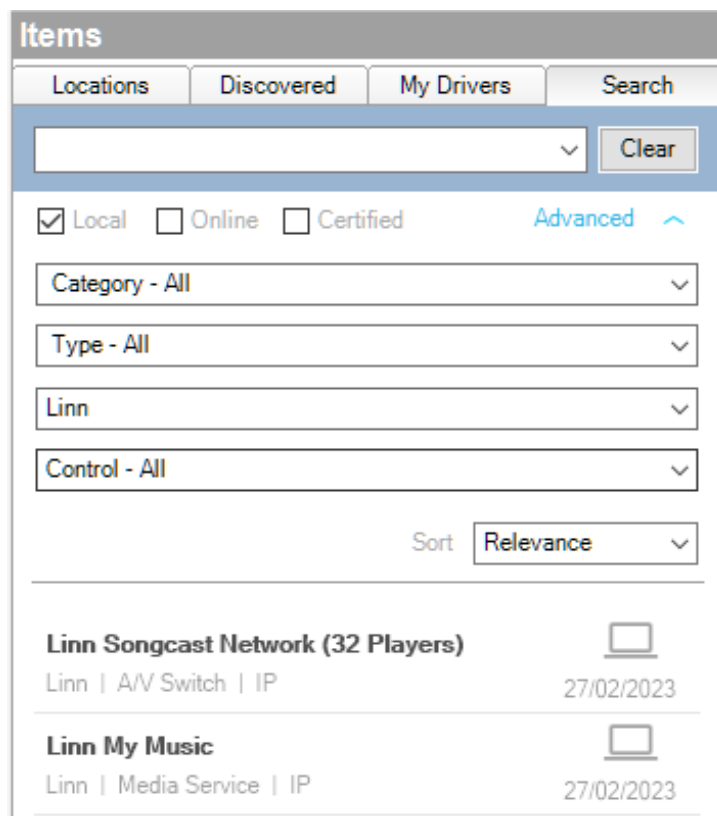

Figure 1: Driver Search

Add one instance of the driver entitled "Linn Songcast Network (32 Players)" into your project. We recommend installing the driver in a room of its own called "Linn Network" and then hiding the room (room Properties → Navigator tab → Hide Room in Location Menu).

NOTE: It is important for the smooth installation of media player drivers that the network driver is added prior to the player drivers. The configuration of the player drivers cannot be completed without the network driver being in place and communicating correctly with a Linn CI-Gateway.

Once you have established that the network driver has installed and discovered all your Linn devices (see below), add one instance of the appropriate "Linn Kustom DSM" driver for each Linn Kustom DSM and one "Linn DS Series" driver for each Linn DS player that you have in your system to the room in your project which contains the player.

It is possible to directly install Kustom and DS players discovered through SDDP just by dragging them into the appropriate room in the configuration. For Kustom devices, this will automatically set the IP address for the device and for DS players, this will automatically associate the driver with that player, setting the **DS or Player** property appropriately.

If the DS or Kustom zone is providing audio directly to a room (standalone room mode), we recommend naming the driver in a way that indicates the room it is in, e.g. "DS (Lounge)". If it is being routed through a switch (matrix switch mode), we recommend naming it according to its usage, e.g. "Martin's Music DS" (for a dedicated personal player), "Network Music DS" (for a single shared player), or "DS Player 1" (for a player to be selected from a bank of players) and also name the subsidiary Network Stream device to match as this is the device that the user will see in the UI.

Service Configuration

Each streaming service used within the system is represented by a separate driver. Install the drivers corresponding to the services you wish to use within the system. The drivers themselves require no further configuration. The currently available services and their drivers are:

airable Radio	mediaservice_ip_linn_airable.c4z
CalmRadio	mediaservice_ip_linn_calmradio.c4z
My Pins (access to Linn pinned items)	mediaservice_ip_linn_pins.c4z
My Playlists (access to Linn playlists)	mediaservice_ip_linn_playlists.c4z
Qobuz	mediaservice_ip_linn_qobuz.c4z
Radio (Linn radio stations)	mediaservice_ip_linn_radio.c4z
Roon	mediaservice_ip_linn_roon.c4z
Spotify	mediaservice_ip_linn_spotify.c4z
Tidal	mediaservice_ip_linn_tidal.c4z
TuneIn	mediaservice_ip_linn_tunein.c4z
Servers (all available UPnP servers)	mediaservice_ip_linn_upnpall.c4z
My Music (single chosen UPnP server)	mediaservice_ip_linn_upnpfav.c4z

Driver Configuration

The network driver is used for discovery of Linn CI-Gateways connected to the network. Only one instance of this driver is required, even if multiple Linn devices are in use. Once it is installed it initiates a discovery process that will result in all the available Linn gateway devices being found.

In the **System Design** view, select the **Linn Songcast Network** device and choose the **Properties** tab from **Advanced Properties.** Select a gateway address from the **Gateway** dropdown box. If for some reason

the gateway is not discoverable on the local network (for instance, it is over a VPN) then the gateway address can be manually entered in the **Static Address** field:
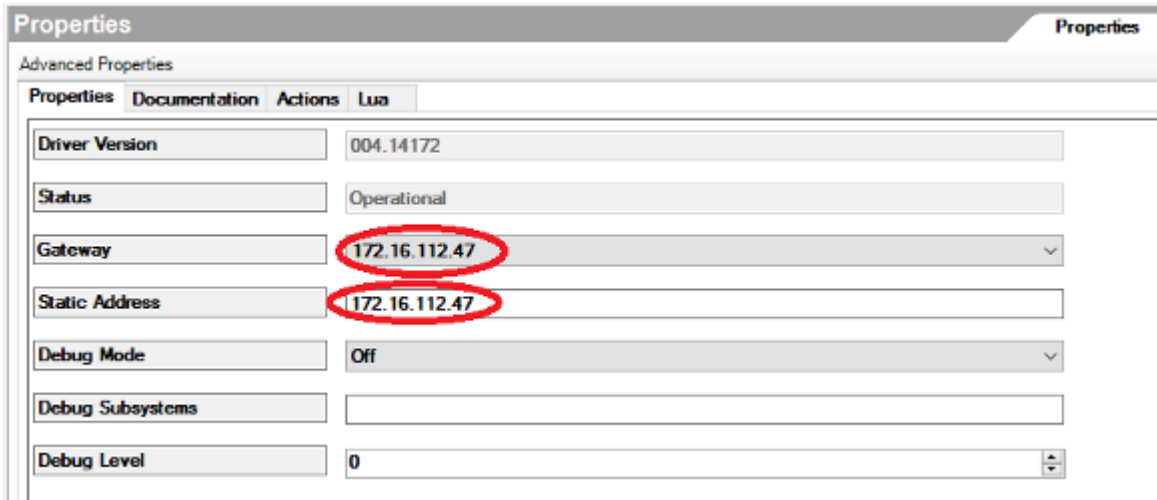

Figure 2: Gateway Selection

In the **System Design** view, select the **Linn Songcast Network** device and choose the **Actions** tab from **Advanced Properties.** Four buttons are displayed:
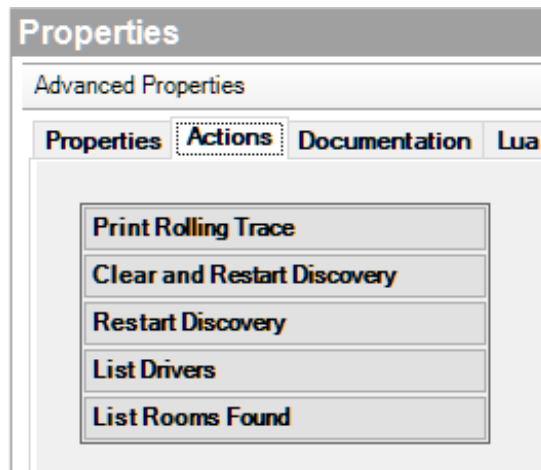

Figure 3: Driver Actions

Discovery happens automatically on installation of the driver, however if for some reason the driver has not correctly picked up all the devices you expect, or if it has previously discovered some devices that have now been removed, you can manually restart discovery. **Clear and Restart Discovery** throws away all information about previously discovered devices and starts again from scratch. This is appropriate if devices have been removed. **Restart Discovery** triggers another round of discovery but adds to the already know devices. This could be used if new devices have been added or if devices were missed by a previous round of discovery. You can check that all your configured room devices have been found by clicking on **List Drivers**, which lists the discovered devices along with the Control4 drivers that have been installed to manage them. Select the **Lua** tab to see the results of the listing:

```
-- Gateways discovered on the network:
  1 172.16.112.201 (cbc9e79f9cf2b1587185beb126f540a9)
-- Linn devices discovered on the network:
  1 172.16.112.37 (4c494e4e-0026-0f21-d437-01328592013f)
  2 172.16.112.203 (TestDs-2981)
  3 172.16.112.204 (4c494e4e-0000-0000-0001-Kustom-0009)
  4 172.16.112.204 (4c494e4e-0000-0000-0002-Kustom-0001)
...
```

Figure 4: Discovery

Finally, **List Rooms Found** shows the Linn room names that are known to the gateway that the network driver is using to interact with the Linn network.

For Linn Kustom DSM devices, install an appropriate **Linn Kustom 2x4** or **Linn Kustom 4x8** driver to manage the device. The simplest way to do this is to use SDDP and drag and drop the discovered device into the project. If for some reason SDDP is not available, the driver can be installed manually. Once installed, refer to the embedded documentation for additional details on this driver.

All other Linn DS products are managed by a **Linn DS Series** driver. Again, this can be installed using SDDP or manually. It is necessary to ensure that each DS driver in your project is controlling the correct Linn device (known as a "room" in Linn terminology). Select the **System Design** view and one-by-one, choose each instance of a player device driver. The **DS or Player** drop-down in the **Properties** window may be used to check and select the correct Linn room name to use as the player in each Control4 room. If you have installed or associated the driver with a DS device using SDDP, the **DS or Player** property will change its name to **DS or Player (SDDP)** and will be read-only as SDDP has already been used to make the correct choice of Linn room name.
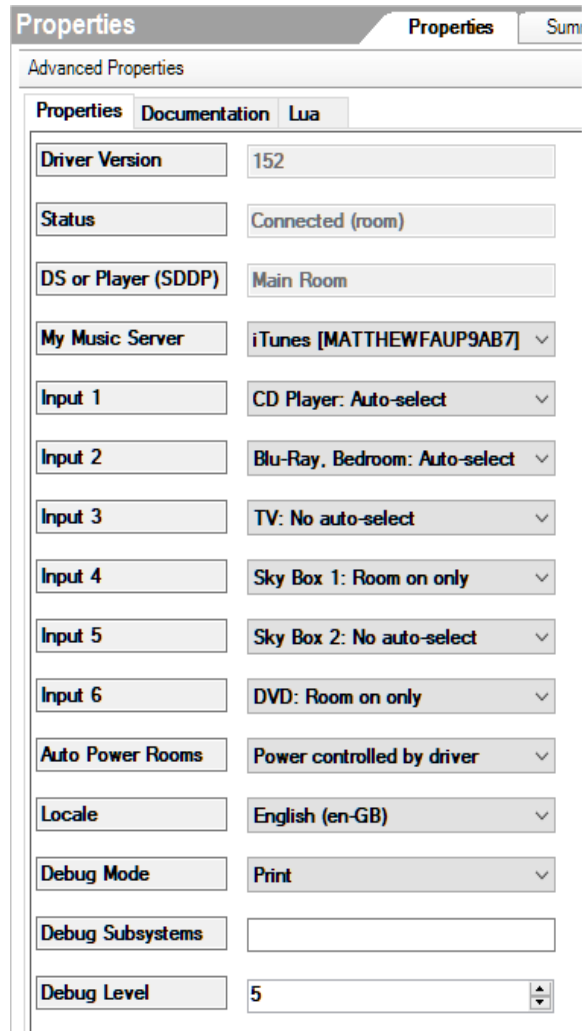
Figure 5: Room Selection

The driver has a "My Music" service available. This allows the installer to configure a single UPnP or OpenHome server as the preferred source for music. The server is chosen through the **My Music Server** property of the driver. The alternative is the "Servers" service, which lists all the discoverable UPnP and OpenHome servers and then allows the user to browse through their content. The installer chooses the corresponding driver for whichever of these options is preferred (see above).

Control4 Connection Configuration

As per standard Control4 practice, it is necessary to establish audio end-point connections for each device. You do not need to manually configure any of the connections between the device driver and the Linn Network driver (classes RF_LINN_INTERNAL, RF_LINN_SONGCAST and LINN_NETWORK_COMMS); these are all managed automatically.

Choose the **Connections** view, and select the **Control/AV** tab. Select the Linn device driver to reveal its connections.

Figure 6: Driver Connections 1

Standalone Room Mode devices only

In the **Control & Audio Video Connections** window, select the **Audio End-Point** with the **Connection** type "AUDIO_SELECTION" and drag it onto an available **Audio End-Point** in the appropriate room. If the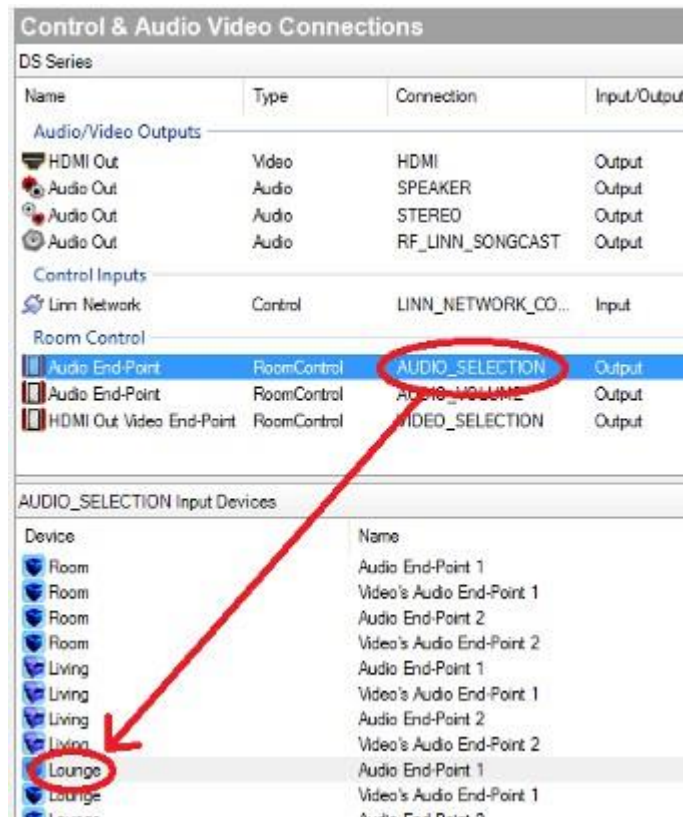 DS device supports video output and it is being used for this purpose, choose the **Video End-Point** with the **Connection** type "VIDEO_SELECTION" and drag it onto an available **Video End-Point** input in the appropriate room.

Figure 7: Driver Connections 2

Depending on the model, DS players can be used to supply audio output directly through a built-in amplifier, by pairing them with a Linn pre-amp, or by pairing with a third-party alternative. If a Linn pre-amp is used then the inputs, outputs and audio control features of the pre-amp are seamlessly integrated into the control of the DS.

If using a built-in amplifier or a Linn pre-amp, drag the Audio End-Point with the Connection type "AUDIO_VOLUME" onto an available Audio Volume input in the appropriate room to indicate that the Linn device is in control of the volume. If integrating with a third-party pre-amp that has a corresponding

Control4 driver, connect the STEREO Audio Out connection to the appropriate input of the pre-amp driver. You can then either disable volume control on the DS (through Settings for the device on your Linn Account) and connect the pre-amp driver to the room's AUDIO_VOLUME connection to have the pre-amp control volume, or fix the pre-amp's volume level and control volume through the DS, in which case the DS should be connected to the AUDIO_VOLUME end point.

For more details about pre-amp configuration, consult the [Konfig manual](#).

Matrix Switch Mode devices only

Connect the STEREO Audio Out connection and, if appropriate, the HDMI Out connection to the appropriate input(s) on the A/V switch driver(s) that represent the switch(es) to which the DS is connected.

All devices

If you are using a player with input connections, then you can also make connections to the relevant line-in connections on the driver. The properties of the driver will tell you which Control4 input each available Linn input is mapped onto, giving you the Control4 input number and the Linn name:

Properties		Properties	Sum

Advanced Properties

Properties   Documentation   Lua

Driver Version	152
Status	Connected (room)
DS or Player (SDDP)	Main Room
My Music Server	iTunes [MATTHEWFAUP9AB7]
Input 1	CD Player: Auto-select
Input 2	Blu-Ray, Bedroom: Auto-select
Input 3	TV: No auto-select
Input 4	Sky Box 1: Room on only
Input 5	Sky Box 2: No auto-select
Input 6	DVD: Room on only
Auto Power Rooms	Power controlled by driver
Locale	English (en-GB)
Debug Mode	Print
Debug Subsystems	
Debug Level	5

Figure 8: Driver Connections 3

The connections might look as follows:

Figure 9: Driver Connections 4

Note that for devices that are connected to Linn pre-amps, the pre-amp inputs will also appear in the list of inputs on the driver properties page and should be connected up in a similar way to the DS's own inputs.

Repeat these steps for all Linn device drivers added to your project.

Control4 Navigator Configuration

By default, Control4 Navigators will automatically display all Linn device drivers in the project in every room (as well as unnecessarily exposing end-points). To change this, choose the **System Design** view, select a **Room** and display the **Navigator** tab.
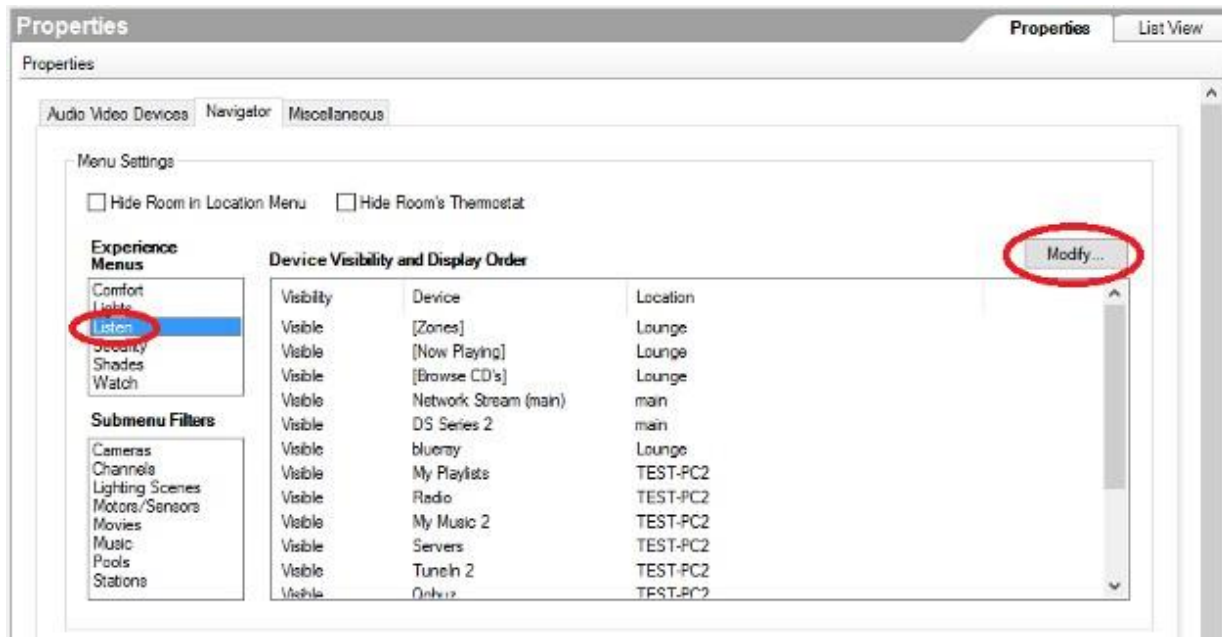
Figure 10: Device Visibility

Choose **Listen** from the **Menu** list and click on **Modify** to change the device display visibility.
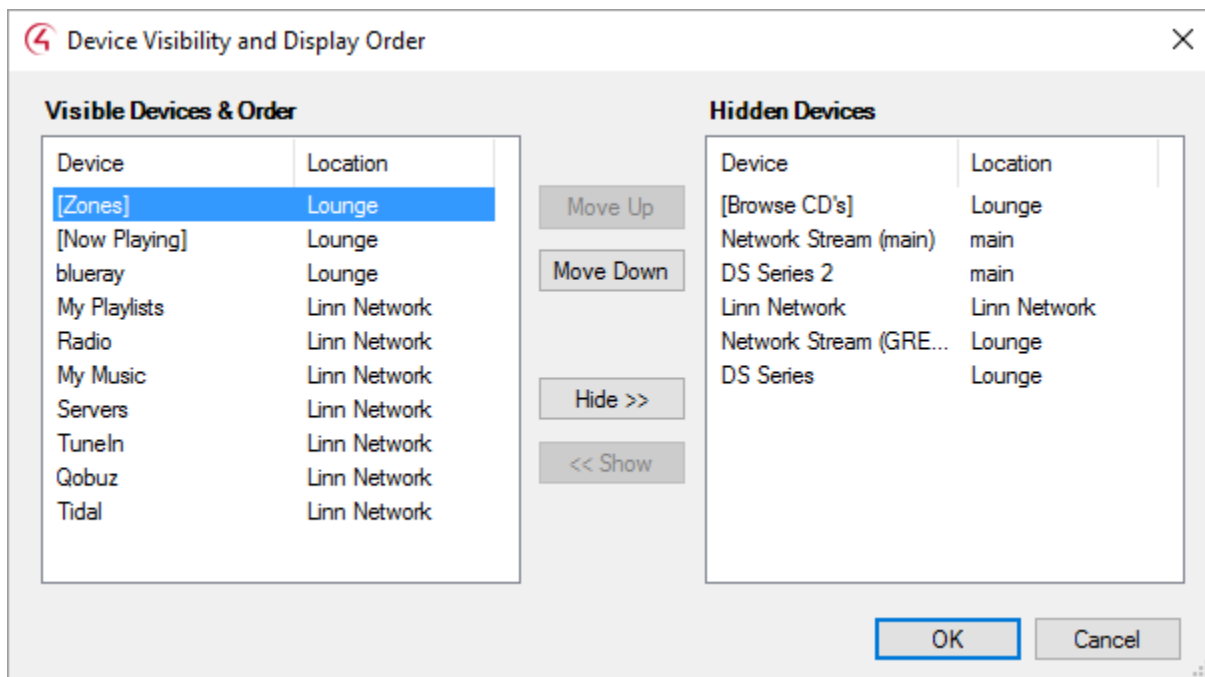

Figure 11: Modify Device Visibility

For rooms that have a DS in the room itself (Standalone Room Mode), you will see devices corresponding to:

- The Linn Network

- All DS devices that are in Standalone Room Mode

- The streaming media players built into these DS devices

- All the individual streaming services available (e.g. Tidal, My Music)

- Any devices connected to the inputs of the DSes

In the **Visibility and Display Order** window, choose the devices you do not want to display from the **Visible Devices & Order** and click **Hide>>** to move them to the **Hidden Devices** list. Click **OK** once all devices not relevant to the room are removed. You are advised to hide all of the above except the streaming services and the connected input devices that you wish to use in that room. Note that the **My Music** service browses directly to the **My Music Server** chosen in the driver properties for the DS in that room, while **Servers** lists all the available UPnP and OpenHome servers. If you don't have a particular preferred server, you can hide **My Music**, while if you have only one music server in the system it would make sense to select that as the **My Music Server** and hide the **Servers** service.

For rooms that have one or more DS devices available through a matrix (Matrix Switch Mode), you will see devices corresponding to:

- All DS devices that connect to the room via the matrix

- The streaming media players built into these DS devices

- Any devices connected to the inputs of the DS devices

You are advised to hide the DS devices as selecting these serves no purpose. The streaming media players are items that the user will choose to browse and select content to play.

NOTE: Changes made in Composer will only be reflected on Navigators if you choose **File** > **Refresh Navigators**.

Properties Summary

The Linn Network driver has the following properties (see the documentation tab of the player driver for its properties):

Property	Purpose	
Driver Version	The version of the driver	
Status	The connection status of the driver, which can be:	
	Created	Just created. If stuck in this status there is a fault with the driver.
	Not connected	Not yet connected to a gateway device.
	Connecting	Establishing a connection with a gateway device.
	Connected	Connected to the device and querying initial status.
	Operational	Working correctly.
Gateway	The IP address of the CI-Gateway to which the driver has connected. One will be selected automatically but this can be overridden by selecting an alternative from the drop-down menu.	
Static Address	If the desired gateway is not discoverable for some reason (such as being on a VPN) then its IP address can be entered manually here. Optionally a port can be	

specified too, e.g. 192.168.1.2:5432. This overrides anything in the Gateway property.

Locale	Used to select the locale for localising any messages and text strings returned by the network driver.
Debug Mode	Used to show debug output in the Director logs and/or Lua debug window.
Debug Subsystems	For use as directed by technical support. Usually leave blank.
Debug Level	Level of debug output detail. 0 is errors only, 1 is errors and other important warning or status messages. Other levels give increasing detail but are usually only used under direction by support.

Variables Summary

The driver has the following read-only variables in addition to the standard variables defined by Control4:

Variable	Purpose
CONNECT_STATE	Indicates the state of the connection from the driver to the CI-Gateway:

0	Not connected.
1	Connecting.
2	Connected.
32767	Fully initialised and operational..

Troubleshooting

Discovery isn't working

This is likely due to missing bindings between the network driver and the device drivers (one cause of which, is adding the network driver to the project after adding the device drivers). To check this, open Composer and display the Connections view, selecting the Control/AV tab. Choose the Linn Network driver and scroll down to the Control Outputs:
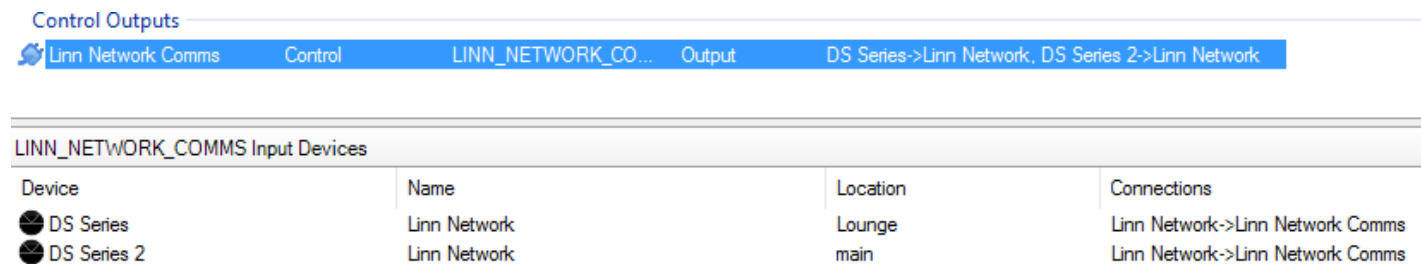

Figure 22: Driver Bindings

The control bindings should be established (as highlighted in the above image). If they are not, drag the Linn Network Comms control output onto each device in turn.

Communication lost with an individual player

Check that the player is still visible on the network and operating correctly. If it is, check whether the Linn CI-Gateway has discovered the device (use the List Rooms Found action on the Linn Network driver). If it has not, press the Restart Discovery action button to prompt it to rediscover the device.

Communication lost with all players

Check that the gateway device being used by the Linn Network driver is still visible on the network and operating correctly. If it is, but the driver is not showing its status as "Operational" then press the Restart Discovery action button to prompt it to rediscover the device.

Adding new devices to the system

If you add new devices to the system (either players or a new Kazoo Server that you want to use as a gateway) you will need to run device discovery again to have the drivers recognise them correctly. Press the Restart Discovery button on the Actions page of the Linn Network driver. Allow a couple of minutes for the system to settle and then you should be able to install drivers for the new devices.

Other problems

To get an idea of what the driver is doing, set the Debug Mode property to Print and the Debug Level property to 1 on either or both of the network and player drivers and then look at the output in the Lua window. This will show any errors, warnings and connectivity messages from the driver.

Technical Support

For further technical support, please contact service@linn.co.uk.